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ABSTRACT

The present study examined the effects of communication mode (oral vs. oral plus manual) and level of communicative competence (high vs. low) on profoundly deaf preschool children's play interactions with their hearing mothers. The sample consisted of 28 dyads equally divided into groups of oral and simultaneous (oral plus manual) communicators that were matched on audiologic and demographic variables. Videotapes of free play interaction were subjected to an interaction analysis. This analysis examined behavior at the level of the dyad or interaction rather than at the level of individuals. The duration and complexity of interaction were strongly affected by both the method and level of communication. Simultaneous dyads had interactions that were longer, more complex, and contained more cooperation and positive affect than did oral dyads. The role of simultaneous communication is discussed in terms of its benefits for both the communicative and social competence of profoundly deaf children. (Author/MP)

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Social Interaction Between Deaf Preschoolers and Their Mothers: The Effects of Communication Method and Communication Competence

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Running Head: Social Interaction in Deaf Preschool Children

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This is a revised and expanded version of "Mother-child play interaction in deaf children: The effects of simultaneous vs. oral communication" presented at the Society for Research in Child Development, San Francisco, March 1979.

Abstract

The present study examined the effects of communication mode (oral vs. oral plus manual) and level of communicative competence (high vs. low) on profoundly deaf preschool children's play interactions with their hearing mothers. The sample consisted of 28 dyads equally divided into groups of oral and simultaneous (oral plus manual) communicators that were matched on audiologic and demographic variables. Videotapes of free play interaction were subjected to an interaction analysis. This analysis examined behavior at the level of the dyad or interaction rather than at the level of individuals. The duration and complexity of interaction were strongly affected by both the method and level of communication. Simultaneous dyads had interactions that were longer, more complex, and contained more cooperation and positive affect that did oral dyads. The role of simultaneous communication is discussed in terms of its benefits for both the communicative and social competence of profoundly deaf children.

As with all children, the social and emotional behavior of deaf children is greatly influenced by their ability to communicate with significant others. However, at present, there has been little investigation of the factors affecting parent-child interaction in families with a young, prelingually deaf child. The present study examines the effect of both differing communication methods and levels of communicative competence on the quality of mother-child play interactions in families with hearing parents and a profoundly deaf preschool child.

To date there has been a paucity of observational research on hearing parent-deaf child interaction. Schlesinger and Meadow (1972) observed mother-child interaction and found that deaf children received lower ratings for compliance and pride in skill mastery than did normal hearing controls. The deaf child's lower compliance was consonant with the finding that mothers of deaf children were rated as less permissive and flexible, and more didactic and intrusive than mothers of hearing children. Within the deaf subsample, communicative level of the dyad was positive related to the child's display of both independent behavior and positive affect during the interaction. Goss (1970) and Collins (1969) also reported that mothers of deaf children gave more directive and controlling communications than did hearing controls. Additionally, numerous extra-familial studies indicate that compared to hearing children, deaf children have a higher incidence of behavior problems (Meadow, 1975), unfavorable personality traits such as egocentricity and impulsivity (Levine, 1960) and lower educational achievement (Office of Demographic Studies, 1971).

It has been suggested that these unfavorable findings result from deprivation of rich communication during early childhood (Mindel & Vernon, 1971; Moores, 1978). This communication deprivation has recently been attributed not to the unavoidable consequences of deafness itself, but instead to the use of

oral-only methods of communication during the preschool years. The oral method consists of the training of speech and speechreading (lipreading) with amplification and training of residual hearing and does not permit manual communication of any kind (Brill, 1971). Oral-only education has been effective for only a minority of prelingual, profoundly deaf children.

Recently there has been substantial controversy concerning the introduction of "simultaneous communication" training for young deaf children (Freeman, 1976; Ling, Ling, and Pilasters, 1977). The simultaneous method (also termed total communication or the bimodal method) includes not only the methods of oralism, but also simultaneous use of manual communication through such methods as sign language, fingerspelling, pantomime, and natural gesture. Proponents of the simultaneous method stress the crucial nature of early communication by any mode possible. They propose that the use of sign language in conjunction with speech will provide the richest communication environment possible and therefore help the deaf child to learn that both communication and social interaction can be effective and gratifying (Mindel & Vernon, 1971).

While a recent survey (Jordan, Gustason, & Rosen, 1977) reported that over 50% of deaf preschoolers in the United States are now receiving simultaneous communication training, research comparing the effects of simultaneous vs. oral communication during the preschool years is lacking. Moores (1978), in a longitudinal study of academic effects of programs, found that children in various types of simultaneous communication programs had higher reading and receptive communication scores than those in oral programs. Greenberg and Marvin (in press), using the present sample, examined the attachment behavior of deaf preschoolers with hearing parents. They reported that very few children were distressed by the brief separation. However, upon reunion,

children who utilized simultaneous communication were more likely to show positive, sociable behavior while oral communicators more often displayed resistant or avoidance behavior.

The present study examines the play interactions of profoundly deaf children, ages 3 to 5, with their hearing mothers. Approximately 90% of all deaf children have hearing parents (Schein & Delt, 1974). Two groups of hearing mother-deaf child dyads were observed: one group used oral communication only; the other used simultaneous communication. The simultaneous communication group was being educated to communicative synchronously by speech and sign language using English syntax. The sample was also subdivided by level of communicative competence.

Two dimension of the play situation were investigated: communicative competence and the structure of social interaction. Communicative competence was assessed by both a molor rating of the dyad's communicative interchange and a detailed analysis of the social/pragmatic function of messages by both mother and child. Social interaction was assessed by examining both the structure or patterning of the interaction (c.f., Bakeman & Brown, 1977) and the frequency of individual social behaviors composing the interactions.

Three hypotheses were tested. First, level of communicative competence, regardless of communication method, would be related to the affect, length and complexity of social interaction. Second, simultaneous communication dyads would have higher levels of communicative competence than would oral dyads. Third, simultaneous communication dyads would show more sociable, complex, and cooperative social interaction that dyads using only oral communication.

Method

Subjects

Twenty-eight hearing mother-deaf child dyads were selected from six preschool and parent-infant programs in metropolitan Washington, D. C. The children met the following criteria: (1) age 3 to 5½; (2) non-verbal intelligence within the normal range (as estimated by school records); (3) hearing level no better than 80 decibels average in the speech range (500 to 4000 hz) in the better ear; (4) deafness occurred prior to language acquisition; (5) no additional known handicaps (e.g., blindness, cerebral palsy); (6) neither parent deaf; (7) all parents demonstrated an active and committed attitude toward using either simultaneous or oral communication with their child as their routine method of communication. This information was solicited from the schools and verified during the actual mother-child observation of the study, i.e., oral dyads did not use conventional signs, simultaneous dyads routinely used signs and vocalization synchronously. The above criteria were strictly followed in order to obtain as "optimal" and distinct samples as possible. Twenty-five of the children lived in stable two-parent families.

A series of one-way analysis of variance tests were employed to test for demographic differences between the simultaneous and oral samples (n = 14 per group). There were no differences on any of the variables; age ($\bar{X}$ = 52 months), hearing loss ($\bar{X}$ = 98.3 decibels), age of diagnosis ($\bar{X}$ = 17.1 months), age of educational intervention ($\bar{X}$ = 22.5 months), months of school experience ($\bar{X}$ = 22.9), sexual or racial composition, parity, or social class.

Procedure

Behavior Observation. Each mother-child dyad was observed in a laboratory situation consisting of two segments; a 5-minute instructional task, and

a 15-minute play/separation procedure. The instructional task consisted of the mother assisting her child in finding a specific toy in the room. The play/separation segment consisted of five episodes each lasting three minutes. During Episodes 1, 3, and 5, the mother and child were together. At the beginning of Episodes 2 and 4 the mother left the room and returned at the end of the episode.

The room was approximately 3.5 x 4.5 meters and included chairs for both mother and child, two tables, and a large variety of toys. When the mother was present she was free to initiate play interaction and proximity whenever she desired. The situation was videotaped through a one-way mirror.

This report is concerned primarily with play interaction and communication during the 8½ minutes when mother and child were present (Episodes 1, 3, and 5); the first 15 seconds of reunion behavior during Episodes 3 and 5 were not scores in the present report. Ratings of communicative competence were scores during the instructional task prior to Episode 1. (See Greenberg and Marvin (in press) for results of separation and reunion patterns during Episodes 2 and 4).

Communication Measures

Communicative competence. Ratings of the communicative competence of each dyad were scored using a scale of the Index of Communicative Competence (Schlesinger and Meadow, 1972). The seven point scale assesses the degree to which both mother and child display mutual or reciprocal understanding of each other's requests, observations, demands, and questions. Communication may occur by speech, vocalization, gesture, sign language, or facial expression. The ratings were scored during the initial instruction task and were temporally distinct from the interaction/separation sequences. Three raters independently scored all the protocols and 85% of the ratings

were within scale point. When two of the three coders agreed, the score of these two coders was utilized. In cases in which all three coders disagreed, the ratings were averaged.

Functional communication coding system. All socially-directed communications of both mother and child were coded during the 8.5 minutes of play interaction. Table 1 presents definitions, examples, and information on coder agreement for a set of 11 mutually exclusive and exhaustive categories encompassing pragmatic and semantic abilities that are represented in communication from the one-word stage in normal hearing children (Bates, 1976; Brown, 1973; Dore, 1974).

Insert Table 1 Here

The system attempts to sample the major functions of communication; seeking information, gaining another's attention, requesting others to act, teaching another, repeating another, discussing objects, and discussing the self and other's thoughts and actions, as well as assessing the affective dimension of communication, e.g., approval and disapproval. The category "teach" was analyzed for mothers only because its rare occurrence in children precluded adequate reliability. Communications were coded in a manner which took into account both the surface grammatical form and other contextual cues to determine the illocutionary force of the message (c.f. Dore, Gearhart, & Newman, 1978). For example, "Would you close the window?" has a grammatical form of a question but has the illocutionary force for the speaker of a behavior request, e.g., shut the window. In such cases these indirect requests were coded as behavior requests.

In addition to this mutually exclusive system, reference to absent objects/persons/events was coded whenever a message with such content occurred (see Table 1). This category was of particular importance because of its abstract nature and the fact that deaf preschoolers have been rarely reported to discuss persons or events outside of the immediate context (Heider & Heider, 1941; Schlesinger & Meadow, 1972).

Each child communication was classified as spontaneous or elicited. This analysis was of interest because, as Moores (1978) and others have noted, the deaf child not only has poorer linguistic skills but is also less likely to use communication spontaneously to initiate interactions. Spontaneous communications were defined as those that either begin sequences of interaction and/or were not direct responses to the other's previous communications.

Social Interaction Measures

Individual social behavior. The frequency of smile, laugh, and touch were scored for both mother and child during the play interactions. The frequency of angry/aggressive behavior, gaze aversion, and the percentage of compliance were scored for the child only. Compliance was defined as the child verbally responding to and/or successfully following the directions of the mother's behavior requests or attempts to get the child's attention. Additionally, the duration of time the dyad was in proximity (within 2 feet) was noted.

Interaction analysis. The interaction analysis is a system that scores behavior at the level of the dyad itself rather than at the level of each participant. In other words, it is concerned with the structure of interaction of the dyad, not with each individual's separate behaviors. The system was applied to the 8¼ minutes of unstructured play interaction (Episodes 1, 3, and 5).

A bout is defined as occurring when one member of the dyad directs an interactive behavior toward the second member, and the second member responds to that message with another interactive behavior and/or action directly related to the other. An interactive behavior is one that is directed to the other and may consist of a spoken word, vocalization, sign, gesture, body movement, body contact, or noise. Looking, by itself, is not scored as an interactive behavior. For example, if a mother communicated to her child "Get the book", and the child either got the book or communicated about it, the mother's message would be defined as the beginning of a bout. If the child did not respond to the mother's message or only looked at the mother, a bout would not have occurred.

A bout ends when five seconds have elapsed during which no interactive behaviors have occurred, unless non-interactive activity during the interim is directly related to the topic of the bout. For example, suppose the mother communicated with the child about a toy across the room. The child walked toward the toy, which took more than five seconds, but then picked up the toy and communicated to mother about it. Despite the passage of more than 5 seconds without interactive behavior, the bout is scored as continuing since the interim activity was directly related to the bout topic.

Each time the topic of conversation (e.g., a toy) or the focus of the bout changed (e.g., a different game beings) a new bout is begun. If two or more bouts occur with less than five seconds elapsed between them, they are concatenated into a higher level of analysis termed an interaction sequence. An interaction sequence may contain one or many bouts and constitutes a measure of how long the dyad maintains interaction without a significant break. A bout measures the amount of time the dyad can interact on a single topic or focus. Each bout was categorized along four dimensions:

1. Complexity. A simple bout was one in which there were fewer than two reciprocal chains of behavior between mother and child. A complex bout was one in which two or more reciprocal chains of behavior occurred, e.g., at least A→B, B→A, A→B, B→A.

2. Topic. A bout was coded as object-related play or conversation if its topic was a material object which was present. A bout was coded as non-object if its topic was an abstract concept, a person (present or absent) or an absent object.

3. Initiation. Each bout was coded as mother- or child-initiated, depending upon which person provided the initial behavior that resulted in a bout.

4. Elaboration. This dimension reflects elaboration of the other's communication that predictably functions to continue and expand the bout. For example, if the child showed and labeled a toy, and mother responded by communicating a new attribute or discussed an action for the child concerning the toy, the mother was scored as elaborator. However, if mother only restated what the child had said, she was not scored as elaborator. A bout may be elaborated by mother, child, both, or neither. Usually, simple bouts were elaborated by neither or only one participant. A bout elaborated by both participants signifies reciprocity or mutuality in the expansion or direction of the bout.

The duration of each bout and interaction sequence was noted. If a bout began less than 5 seconds prior to the end of Episode 1, 3, or 5, it was not included. Likewise, if a bout ended less than 5 seconds after Episode 1 began it was excluded.

Coder Agreement

Seven transcripts (25%)distributed throughout the analysis were coded

independently by two teams of two coders each. For the communicative acts and individual social behaviors, estimates of agreement were computed as the number of agreements divided by the number of agreements plus disagreements plus omission errors. Table 1 presents coder agreement for each communication category. Agreement for the individual social behaviors ranged from .69 (avert gaze) to .93 (touch) ($\bar{X}$ = .86). For the interaction analysis, agreement was computed both separately for comission errors only (actual disagreement) and for comission and omission errors combined. Both agreement estimates are reported for the following interaction measures: bout frequency (.86; .76); interaction frequency (.92; .80); complexity (.88; .76); topic (.83; .70); initiation (.86; .72); elaboration (.89; .76) and bout duration (.88; .75). Because the errors of omission were randomly distributed across coding teams, protocols, and coding categories, no particular bias was introduced and therefore these errors do not effect analysis of group differences. The remaining transcripts were scored by one of these coding teams.

Statistical Analysis

Comparison between communication methods and competence levels on frequency measures were carried out by analysis of variance tests. The Bonferonni correction at the .05 level was utilized, when applicable, to control for the occurrence of spurious significant results. Group comparisons of proportional data were analyzed by the Mann-Whitney U test (2-tailed).

Results

Communicative Competence

Simultaneous communication dyads tended to show higher scores on the rating of communicative competence (reciprocal understanding) than did oral communication dyads, $F(1, 26) = 3.8$, $p = .07$. The lack of statistically

significant difference was attributed to the substantial variance within both groups. However, because level of communicative competence was hypothesized to be a crucial differentiating factor in the social behavior of deaf dyads, the sample was also subdivided into relatively high and low communication dyads, regardless of communication method.[3] This sample division resulted from dividing the entire sample at the median on the rating of communicative competence. The subdivision by level of communication was crossed with method of communication yielding four subgroups of equal size (N=7): high oral, high simultaneous, low oral, and low simultaneous dyads. As a result, analyses by communication level and method are not confounded.

Repeated Measures

The series of four-factor repeated-measures ANOVA tests were performed on functional communicative acts and individual social behaviors with communication method, communication level, and sex as between-subjects factors and episodes as the within-subjects factor. There were no significant differences between Episodes 1, 3, and 5, on any communicative or social behaviors. Additionally, there were no behavioral differences between the first and second separations. That is, mother's absences per se did not differentially effect interaction or communication after her returns. Therefore, all three episodes (8½ minutes total) in which the mother and child were present were combined for the forthcoming analyses. There were no significant main effects of sex.

Functional Communication Categories

Children. A 2 x 2 (Communication Method by Communication Level) analysis of variance of the frequency of all types of communications revealed no significant effect for communication method (Simultaneous $\bar{X}$ = 58.9, Oral $\bar{X}$ = 71.9).

However, there was a significant effect for communication level; high communicators displayed more ($\bar{X}$ = 77.4) messages than low communicators ($\bar{X}$ = 53.1), F (1, 25) = 6.4, $p < .025$. There were no interaction effects. Table 2 displays the percentage of children's communications by category for the four groups.

Insert Table 2 Here

None of the 12 simultaneous vs. oral category comparisons were significant. This finding is congruent with the lack of difference between groups in ratings of communicative competence. However, simultaneous children showed a significantly higher percentage of spontaneous communications (37%) than did oral children (20%), $U = 148$, $p < .05$.

High competence communicators displayed a higher percentage of question-asking, $U = 151$, $p < .02$, discussion of their own actions, $U = 146.5$, $p < .05$, declaring information, $U = 167$, $p = .001$, and discussion of non-present objects/persons/events, $U = 140$, $p < .01$. Additionally, more high communicators than low communicators communicated at least once regarding a non-present object, person, or event (Fisher's Exact Test, $p = .02$). Low communicators displayed more unclassifiable communications, $U = 150$, $p < .05$. There were no differences in the use of spontaneous vs. elicited communications as a result of communicative competence.

Mothers. A 2-way ANOVA of the total frequency of maternal communications revealed a significant main effect only for communication method. Oral mothers communicated more often ($\bar{X}$ = 128.9) than did simultaneous mothers ($\bar{X}$ = 89.3),

F (1, 25) = 6.2, $p < .025$. However, oral mothers showed significantly greater self-repetition than did simultaneous mothers, F (1, 25) = 5.2, $p < .05$. If these repetitive statements are excluded from analysis, the differences between simultaneous and oral mothers become non-significant. Table 3 displays the percentages of maternal communications by category. A series of Mann-

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Insert Table 3 Here

Whitney U Tests indicated no significant differences in the types of communication utilized by mothers as a function of communication method. In light of the major differences in communication between children in high vs. low communication dyads, it is surprising that mothers of these two groups showed only one difference; high communication mothers used a higher percentage of references to absent objects/persons/events, $U = 145.2$, $p < .05$.

Individual Social Behavior

Communication method. Table 4 displays the frequency of discrete social behaviors for both children and mothers. As hypothesized, simultaneous

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Insert Table 4 Here

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children showed more positive interactive behaviors than did oral children. Specifically, simultaneous children showed a higher percentage of compliance with their mother's requests, $U = 210.4$, $p < .01$, touched their mother's

more frequently, F (1, 25) = 5.1, $p < .05$, and averted their gaze less frequently than did oral children, F (1, 25) = 4.2, $p = .05$. Reciprocally, mothers in simultaneous dyads laughed more frequently than those in oral dyads. F (1, 25) = 4.4, $p < .05$.

Communication competence. There was only one significant difference as a result of communication level. High communication children showed less aggression than did low communication children F (1, 25) = 4.6, $p < .05$. There were no differences between mothers in high and low communication dyads on any variables.

Interaction Analysis

Communication method. Table 5 presents group means and percentages of dyadic interaction measures. As hypothesized, simultaneous communicators

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Insert Table 5 Here

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showed more social and cooperative interactions. Specifically, simultaneous dyads had longer mean bout durations, F (1, 25) = 7.6, $p = < .01$, longer mean interaction durations, F (1, 25) = 12.5, $p < .01$, and spent more total time in interaction, F (1, 25) = 10.3, $p < .01$. However, there was no group difference in the time in physical proximity. Simultaneous dyads also had longer complex bouts, F (1, 25) = 5.7, $p < .05$, and longer interactions that contained at least one complex bout, F (1, 25) = 13.1, $p < .001$. These last two results indicate that the simultaneous vs. oral differences were not due merely to a higher frequency of very short bouts in oral dyads. There

was no difference in the frequency of bouts, though as a result of the oral dyad's shorter interactions, their interactions were more frequent, F (1, 25) = 9.7, $p < .01$.

Consonant with the above duration measures, simultaneous dyads had a higher percentage of complex and fewer simple bouts, $U = 154.5$, $p < .01$, and a higher percentage of bouts elaborated by both participants, $U = 146.5$, $p < .05$. There were no differences in measures of bout initiation or object vs. non-object focus.

Communication competence. High communication dyads had a longer total interaction time, F (1, 25) = 14.8, $p < .001$. However, there were no differences on any other duration measures. High communicators had a lower percentage of mother-elaborated bouts, $U = 128.5$, $p < .001$, a higher percentage of mutually or both elaborated bouts, $U = 172.5$, $p < .01$, a higher percentage of bouts with non-object topics, $U = 48.5$, $p < .05$, and tended to have a higher percentage of complex bouts, $U = 133.5$, $p = .10$. There was one interaction effect; high communication simultaneous dyads had significantly more time in interaction than did low communication oral dyads, F (1, 25) = 6.4, $p < .025$.

Subgroup Analysis

Table 6 presents interaction measures for each of the four subgroups ($n = 7$ per group) to facilitate comparison of communication methods within the two competence levels. For high communicators, simultaneous dyads had significantly higher scores (t-test or Mann Whitney U, $< .05$) than oral dyads on all measures except total interaction time. For low communicators, simultaneous dyads had significantly higher scores ($< .05$) on all measures than did the oral dyads. These findings indicate that (1) simultaneous-oral differences are not merely the result of differences in dyads of low communi-

cative competence (except for total interaction time); and (2) high communication dyads who utilize simultaneous communication show the most favorable interactions. Of particular interest is the contrast of high oral and low simultaneous dyads. While only one measure shows significant difference favoring the low simultaneous dyads (% compliance), all measures, except total interaction time, show higher mean scores for low simultaneous than high oral dyads.

Discussion

As hypothesized, differences in dyadic interaction were associated with communicative competence. The higher aggression and gaze aversion, lower total interaction time, and higher percentage of both simple bouts and bouts elaborated only by the mother in the low communication competence dyads illustrate the difficulty that mothers of low communication children had in sustaining interaction with their child. Conversely, the higher percentage of bouts with a non-object focus, bouts that were mutually elaborated, and longer play time in high communication competence dyads indicate the importance of early and successful communication for deaf children (Schlesinger and Meadow, 1972). However, as subgroup differences indicate, a number of interactional differences result from method of communication and not necessarily level of competence.

Children rated as higher in communicative competence not only communicated more often, but also communicated different types of messages. Specifically, high communication children more often than low communication children asked questions, discussed non-present objects and events, and discussed their own actions. Greenberg and Marvin (in press) also found that these high communication children showed a more advanced phase of attachment and were

reported by their mothers to have higher expressive and receptive skills concerning time concepts than did low communication children. These abilities greatly expand the realm of the children's social and cognitive domains by allowing them to discuss both past events (memories) and future events (fears and expectations). Brinich (1976) has reported that the frequency of stating information and asking questions were related to both communicative competence and IQ in deaf children.

The second hypothesis, that simultaneous communication dyads would show significantly higher levels of communicative competence than oral dyads, was not strongly supported. Additionally, there were no differences between groups in the functions of communication utilized. This finding is perhaps due to two interacting factors that are indicative of the current realities of deaf preschool education. First, about half of the simultaneous communication dyads could be characterized as "non-optimal", despite the care taken in sample selection (Greenberg, 1978). This resulted from a number of factors including the absence of continued sign language training for the parents, and the short period of time some dyads had been using simultaneous communication. Second, because of the recent expansion of various total communication programs, oral programs have become smaller and more successful. While in the past all deaf children were trained only orally, resulting in a higher percentage of failures, at present a selection process takes place such that only relatively "successful" oral children (as measured by communication competence) remain in oral programs.

Despite the lack of simultaneous vs. oral differences in communication, the third hypothesis, that simultaneous dyads would demonstrate more complex and sociable interactions than oral dyads was strongly supported. Specifically, simultaneous children showed less gaze aversion and greater touching, and

reciprocally their mothers showed more frequent laughing. Simultaneous dyads spent more total time together in interactive play, sustained each bout longer, sustained interactions that may have included more than one bout topic longer, had a higher percentage of complex bouts (containing at least two reciprocal chains of interaction), and had more bouts that were mutually elaborated and expanded. Simultaneous children also utilized communications in a more active and responsive fashion that did oral children. This was evidenced in their higher rates of spontaneous initiation of communication and their higher compliance to their mother's demands and requests. Spontaneous communication is of particular importance in deaf children, who commonly show delayed or passive language development, because it signals the child's intention to independently and reciprocally communicate (Schlesinger, 1978). These findings both imply a pattern of more positive affect and contingent responsiveness in simultaneous communication dyads and indicate the often frustrating nature of interaction for orally-trained children.

The alternative viewpoint, that the above findings indicate greater dependence and social immaturity in simultaneous children, is discounted by two lines of evidence. First, while the simultaneous and oral children differ in the quality and duration of interaction with their mothers, they do not differ in the amount of time spent in proximity to her. Second, there were no differences in the percentage of interactions initiated by simultaneous vs. oral children. Therefore, rather than implying greater dependency in the simultaneous children, the findings probably reflect an increased desire on the part of both simultaneous mothers and children for continued joint interaction.

Of both theoretical and practical interest was the finding that most of the interactional differences that resulted from different communication

methods were not the result of differing levels of communicative competence. Only two measures, gaze aversion and interaction time were affected by both communication method and communication level. That is, the communication method itself, separate from competence level, strongly influenced the flow of interaction. This conclusion is further justified by the subgroup analyses which indicated significant interactional differences between simultaneous and oral dyads separately at each level of competence.

A certain level of communicative competence, as measured by the frequency counts of different types of communications, may lead to one of many interactional outcomes (Westerman & Havstad, in press). To understand the dynamic qualities of interaction one must examine not only static communicative competence (functional communication acts), but also the pattern in which communication is embedded in ongoing social interaction (interaction analysis). The finding that simultaneous and oral dyads showed no differences in types of communicative acts while displaying major differences in the patterning or contingent responsiveness of the interaction leads one to consider what differences characterize the social milieu in which oral and simultaneous children are taught communication skills. In contrast to the struggle and repetition often present in oral-only education, the relative ease of simultaneous communication might provide children and parents with a more accepting linguistic environment in which to enjoy interaction. Reciprocally, positive social interaction may be the catalyst for further communicative gains.

The mothers in the present sample communicated a high percentage of demands and questions (approximately 40%). Both Brinich (1976) using mothers of deaf children and Kogan, Wimberger, & Bobbitt (1969) using mothers of retarded children reported most frequent use of these categories. In contrast, Kogan et al (1969) found mothers of normal children most frequently used

messages that either acknowledged their children's activity or concerned their own actions or thoughts. The similarity in communication between mothers of children with various handicaps suggests commonalities in their approach to interaction with their child. Frequent questioning probably results from the mother's attempt to both engage them in interaction and provides an elaborative technique for sustaining interaction (Westerman & Havstad, in press). The high rate of demands is probably a realistic adaptation necessary to both control their children and to engage them in interaction (Schlesinger & Meadow, 1972). Surprisingly, the levels of communicative competence of the dyad did not affect the mother's use of different pragmatic or functional messages. While an analysis of MLU or syntactic complexity might have shown differences as a result of communicative competence, similar to mothers of hearing children (Snow & Ferguson, 1977), difficulties in interpreting the utterance length of mother's messages that contained gestures and signs precluded this type of analysis.

Ling, Ling, and Pflaster (1977) stated that early use of simultaneous communication is not necessary because children who fail at oral-only communication are not harmed since they can be rapidly transferred to sign language. However, the present study found that ineffective oral experience (especially for the low oral subgroup) was associated with negative and fragmented interaction. In addition, transfer to a sign system is probably not a rapid process. Two variables differentiated high vs. low simultaneous communicators: age at diagnosis and months of school experience in simultaneous communication. Simultaneous communication is a skill that requires a great deal of effort by the child, parent, and school in order to be successful.

The above findings tentatively support the previously untested polemics of simultaneous communication advocates (Mindel and Vernon, 1971), who posit

that because simultaneous or total communication is a natural method of communication for the deaf, it may lead to more positive social interactions. The cyclical, reinforcing nature of these positive interactions should lead one to hypothesize that as they grow older, simultaneous communicators would be better socially adjusted than would oral deaf children. However, these findings do not necessarily assert that an oral-only approach will result in less than optimal social interactions. This will depend on the skills and attitudes of the child, parents, and school. There is need for longitudinal examination of such outcomes. In the past, research has been almost completely absent in this domain. Hopefully, it will further contribute to both theoretical understanding and practical recommendations for deaf children and their families.

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Footnotes

[1]Copies of the complete inventory and behavioral definitions may be obtained from the author.

[2]Copies of the functional communication categories and their definitions may be obtained from the authors.

[3]Greenberg and Marvin (in press) reported that children in high communication dyads showed two major demographic differences from those in low communication dyads. They had been diagnosed as deaf earlier in life, entered early intervention programs earlier, and consequently had significantly more months of school experience.

Table 1

Definitions of Communication Coding System[1]

Category (and Reliability)	Definitions and Examples
1. Questions (R = .88)	Requests for information or confirmation of another's action; "How old are you?" "Is it alright?"
2. Behavior Requests (R = .86)	Commands, demands, or requests that call for action; "Put that block down" "Would you get me that toy?"
3. Reference to Present Objects (R = .93)	Declaring the attributes of objects: "This truck is yellow" or non-verbal behavior such as showing an object.
4. Discuss Self-Action (R = .90)	Declaring one's own actions, thoughts, or feelings; "I'm building a generator."
5. Discuss Other's Action (R = .86)	Declaring the actions, thoughts, or feelings of the other; "You're building a house."
6. Approve Other's Actions (R = .83)	Declaring approval, agreement, an encouragement of the other or the other's actions; "That's nice."
7. Disapprove Other's Actions (R = .92)	Declaring disapproval, disagreement, or cirticism of the other or the other's actions; "I don't like when you scream."
8. Get Other's Attention (R = .91)	Communications that specifically serve to call or get the attention of another; "Look here Aaron."
9. Repeat (R = .90)	Copying the other's communication
10. Declare Information (R = .78)	Short declarative statements that are direct responses to questions and don't reference objects: "Yes" "No"

Table 1(continued)

Definitions of Communication Coding System

Category (and Reliability)	Definitions and Examples
11. Teach (R = .80) (Mother-only)	Mother's communications that specifically function to demonstrate or teach: "See, it goes like this" or non-verbally demonstrating an action.
12. Unclassifiable Messages (R = .82)	Verbalizations, vocalizations, gestures, or signs whose function could not be discerned due to message ambiguity, camera angle, or quality of video-tape.
13. Reference to Absent Objects, Persons, or Events (R = .98)	Any communication that concerns, objects, persons, or events not present in the room: "I want to swim tomorrow."

[1]Categories 1 through 12 are mutually exclusive and exhaustive.

Table 2

Percentage of Child's Communications by Communication Method and Level

Measure	Method		Level	
	Simultaneous	Oral	High	Low
Question (Ask)	4.0	2.7	5.5*	1.6
Behavior Request	2.8	5.0	3.4	4.4
Reference Present Object	46.9	41.6	43.8	44.6
Discuss Self-Action	6.2	3.6	6.4*	3.4
Discuss Mother's Action	0.7	1.0	1.2	0.4
Approve Mother's Action	3.2	2.5	3.5	2.2
Disapprove Mother's Action	2.4	2.3	2.5	2.2
Declare Information	4.4	3.6	5.8***	2.5
Get Mother's Attention	2.1	1.6	2.7	1.1
Repeat Mother	3.8	5.0	3.8	5.0
Unclassifiable Communications	23.2	31.0	21.4	32.6*
Reference Absent Objects/ Persons/Events	2.2	1.3	2.9**	0.0

*p < .05

**p < .01

***p < .001

Table 3

Percentage of Mother's Communications by Communication Method and Level[1]

Measure	Method		Level	
	Simultaneous	Oral	High	Low
1. Question (Ask)	26.2	28.9	31.2	23.9
2. Behavior Request	13.6	16.8	13.4	17.0
3. Reference Present Object	28.1	22.8	24.9	25.9
4. Discuss Self-action	4.1	3.9	4.6	3.5
5. Discuss Child's Action	3.6	5.4	4.2	4.8
6. Approve Child's Action	8.3	7.2	6.8	8.6
7. Disapprove Child's Action	2.7	2.5	1.4	3.8
8. Declare Information	1.8	2.4	1.9	2.3
9. Get Child's Attention	8.6	4.8	6.9	6.5
10. Repeat Child	2.0	3.1	2.1	2.2
11. Teach	1.0	2.3	1.7	1.6
12. Reference Absent Objects/ Persons/Events	3.1	1.9	3.7*	1.2

*$p < .05$

[1]Categories 1 through 12 are mutually exclusive and exhaustive.

Table 4

Individual Social Behavior by Communication Method and Level

Measure	Method		Level	
	Simultaneous	Oral	High	Low
Child				
Compliance (%)	81.5**	59.5	75.9	65.1
Smile	6.9	4.5	5.3	6.1
Laugh	0.8	0.4	0.6	0.6
Touch	0.9*	0.1	0.5	0.5
Avert Gaze	0.4	1.4*	0.5	1.3
Aggression	0.5	0.9	0.1	1.4*
Mother				
Smile	5.9	4.3	5.4	5.7
Laugh	2.3*	1.1	2.1	1.3
Touch	5.4	4.0	4.1	5.1

*p < .05

**p < .01

Table 5

Interaction Measures by Communication Method and Level

Measure	Method		Level	
	Simultaneous	Oral	High	Low
Frequency of Bouts	12.1	14.4	14.5	12.0
Frequency of Interaction	8.0	11.1**	9.7	9.4
Mean Bout Duration	36.7**	18.1	27.3	24.2
Mean Interaction Duration	48.7**	25.2	43.3	30.7
Total Interaction Time	361.0**	267.0	370.4***	257.7
Mean Duration Complex Bouts	41.6*	27.6	36.0	33.3
Mean Duration Complex Interaction	56.3*	32.4	50.0	38.8
Complex Bouts (%)	69.0**	50.5	67.8	51.7
Simple Bouts (%)	31.0**	49.5	32.2	48.3
Child Initiated (%)	49.2	44.6	51.3	42.5
Mother Initiated (%)	50.8	55.4	48.7	57.5
Mother Elaborated (%)	24.3	32.8	17.2	38.8***
No Elaborator (%)	17.1	27.5	19.7	25.8
Both Elaborate (%)	58.6*	39.7	63.2**	34.5
Object Focus (%)	88.4	91.5	82.9	95.9
Non-object Focus (%)	11.6	8.5	17.1*	4.1

*p < .05

**p < .01

***p < .001

Table 6

Interaction Measures by Communication Subgroups[a]

Measures	High Simultaneous	High Oral	Low Simultaneous	Low Oral
Mean Bout Time	31.5*	24.0	30.5**	13.6
Mean Inter. Time	52.2*	34.4	45.2**	16.2
Total Inter. Time	380	360	341**	174
% Complex Bouts	76.2	59.5	61.9	41.5
% Spontaneous Comm.	39.1*	21.9	35.1*	17.4
% Compliance	87.9*	64.0	75.1*	55.0

[a] N = 7 per group

*p < .05

**p < .01